

### **REMARKS**

Claims 34-39, 41-47, and 49-53 are withdrawn from consideration. Upon entry of this amendment, Claims 1-39, 41-47, 49-53, and 55-60 are pending.

### **REJECTIONS UNDER 35 U.S.C. §112**

Claims 1-33, 55-60, are rejected under 35 U.S.C. § 112, second paragraph, as being allegedly indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 1, 2, 8, 13, 25, 29, 55, and 56 are also rejected under 35 U.S.C. § 112, first paragraph, as allegedly failing to comply with the written description requirement. In the interest of compact prosecution, Applicants will treat those rejections in combination. Applicants respectfully traverse those rejections.

### **Claims 1, 13, 55, and 56**

With regard to claims 1, 13, 55, and 56, the Office has indicated that it is unclear if the applicant is claiming a fluid contained within the tube or just that the tube is capable of guiding light within a fluid in the tube, if present. Claim 1 is drawn to a measuring cell. That measuring cell comprises at least one tube *capable* of guiding light through a fluid contained therein. Claim 1 further indicates that the at least one tube comprises

- a first opening,
- a second opening and
- an inner surface coated with at least one binding agent capable of binding at least one target from a sample,

wherein the inner surface of the at least one tube is exposed to said sample by loading said sample through the first opening into said at least one tube.

Claim 13 is drawn to a system comprising *inter alia* such a measuring cell.

As correctly noted by the Office, those claims do not require the presence of a fluid in the tube. Rather, the claims simply reflect that when a fluid is introduced into the tube during operation, the light is guided through that fluid rather than by the walls of the tube itself. In other words, Applicants respectfully maintain that claim 1 encompasses embodiments wherein there is no fluid within the tube as well as those embodiments wherein fluid has been introduced. In those embodiments wherein there is fluid within the tube, the tube is capable of guiding light through that fluid.

The Office also has questioned whether there may be a light guiding device within the fluid or whether the light is guided through the fluid itself, if present. Applicants are unsure of the source of the Office's confusion as the present application does not discuss the use of a light guiding device within the fluid contained within the measuring cell. Regardless, Applicants maintain that the claims are drawn to the latter embodiments wherein the light is guided through the fluid itself and not through a secondary light guiding device within the fluid.

Applicants further note that there is ample support in the present application for the concept of guiding light through a fluid contained within the tube. For example, paragraphs [0009], [0012], [0027] and [0035] illustrate different ways in which the tube can be made to guide light through the fluid within the tube. More specifically, paragraph [0027] reads, in part: "A tube filled with gas or liquid may be turned into an optical waveguide by a specific design of its optical properties. A change in the optical properties of the fluid filling the tube or a change of the properties of the interface between the tube and the fluid may induce a change in the amount or in the characteristics of the guided light." The abstract also describes embodiments wherein light is guided through a tube and a fluid is run through the same tube.

Claims 55 and 56 are dependent on claim 1. Claim 55 recites that the tube comprises a material capable of guiding light through the fluid contained within the tube whereas claim 56 provides that the tube comprise a material having at least one feature capable of guiding light through the fluid contained within the tube. As with claims 1 and 13, those dependent claims do not require that a fluid be contained within the tube.

Rather, they elaborate on the nature of the tube, i.e., that it comprises a material capable of guiding light or a material having at least one feature capable of guiding light. Again, in both cases, Applicants respectfully maintain that the claims reflect that the material or feature be *capable* of guiding light in a fluid contained within the tube, in the event that such a fluid is introduced into the tube, but that the claims do not require the presence of that fluid.

#### **Claims 2 and 24**

With regard to claims 2 and 24, the Office has questioned how the fluid and sample are different from each other. Applicants respectfully maintain that, for the presently claimed invention, the samples are fluids (either gaseous or liquid) as correctly noted by the Office.

However, as is made clear in the specification, all fluids are not samples. More specifically, at page 2, the specification indicates that samples may comprise DNA, proteins, chemicals, toxins, viruses and/or bacteria or any other targets. Those samples are introduced into the measuring cell for analysis. However, the specification also describes other fluids, fluids that are not samples such as cleaving or digesting agents (page 5); amplification agents (page 6); and washing agents (page 6), that can be introduced into the measuring cell. Thus, samples can be viewed as a subset of fluids.

#### **Claims 6 and 28**

With regard to claims 6 and 28, the Office has questioned whether it is required that the tube comprise one or more layers or whether the multiple layers are optional. Applicants respectfully maintain that claims 6 and 28 are drawn to specific embodiments wherein the surface comprises one or more layers. Applicants have therefore amended those claims to delete the term “optionally”.

#### **Claims 8 and 29**

The Office has requested clarification as to the location of support in the specification for a tube that is a fluid core waveguide. The specification at page 9 includes Teflon AF as an example of a useful tube material. As one of ordinary skill in the art will readily appreciate, that material is well known to be used in fluid core waveguides.

### **Conclusion**

Applicants respectfully maintain that the Office's concerns have been addressed and request that the rejections under 35 U.S.C. § 112 be withdrawn.

### **REJECTIONS UNDER 35 U.S.C. §102**

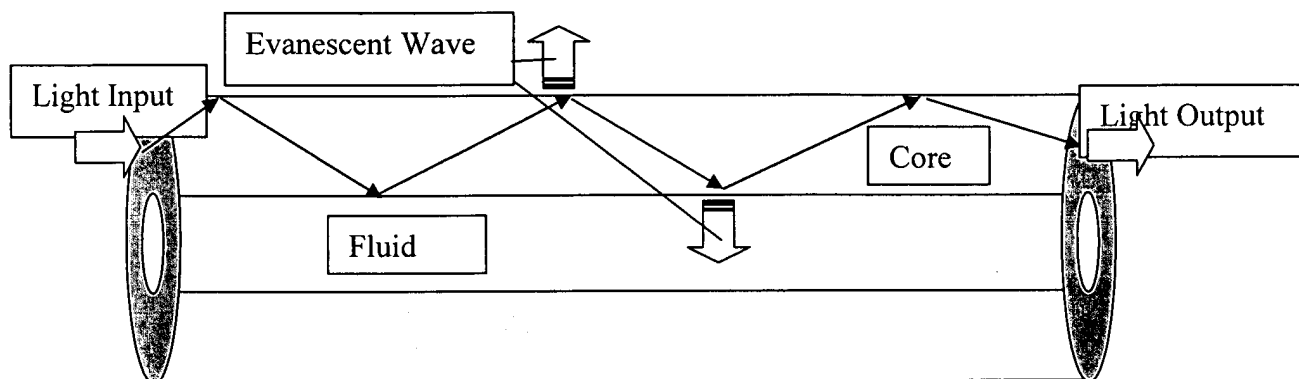
#### **Bohnenkamp**

Claims 1-6, 9, 11-18, 21, 24-28, 30, 32, 33, 55-58, and 60 are rejected under 35 U.S.C. § 102(b), as allegedly being anticipated by Bohnenkamp, U.S. Patent No. 6,252,657 ("Bohnenkamp"). Applicants respectfully disagree and traverse this rejection.

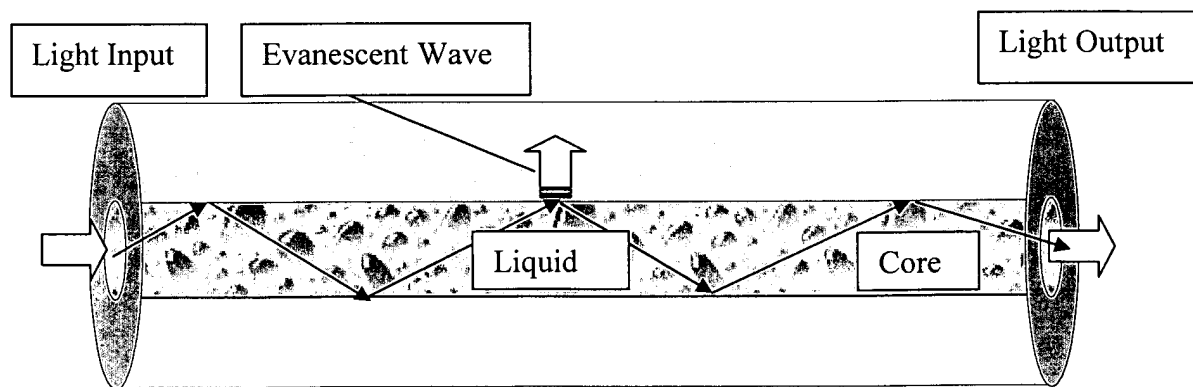
Bohnenkamp is cited as teaching a light guiding device such as a capillary with a first and second opening wherein analytes are fixed on the inner surface of the capillary. Bohnenkamp does not teach or fairly suggest a measuring cell comprising at least one tube capable of guiding light through a fluid contained therein. Rather, it is the capillary of Bohnenkamp, not the fluid within such capillary, that serves as the means to guide light. Indeed, Bohnenkamp states that "...the light penetrates the capillary" and that "the capillary constructed from light guiding material for the light that is excited in the area of the evanescent field, and the refractive index of an inner coating on the capillary being smaller than the refractive index of the capillary material."

For the Office's convenience, Applicants have provided schematic depictions of the Bohnenkamp device and that claimed by Applicants. The diagram below shows a capillary hollow waveguide, i.e., a capillary with walls that function as a waveguide. Light generally enters the walls through a section and comes out of it the same way.

Under certain conditions, an evanescent wave may come out of the inner and/or outer wall. The capillary may also contain fluid, but the light is guided in the solid part of the capillary waveguide. This is the way in which Bohnenkamp uses the capillary hollow waveguide.



In contrast to Bohnenkamp where the light is guided through the walls of the tube, the presently claimed invention is drawn to measuring a change in the characteristic of the light that is guided through the tube. Shown below is an embodiment wherein the fluid is a liquid. Here, the light generally enters the waveguide, travels through the fluid (and not the solid wall of the device), and finally exits the waveguide. While some light may come out of the core through an evanescent wave, it is a side effect.

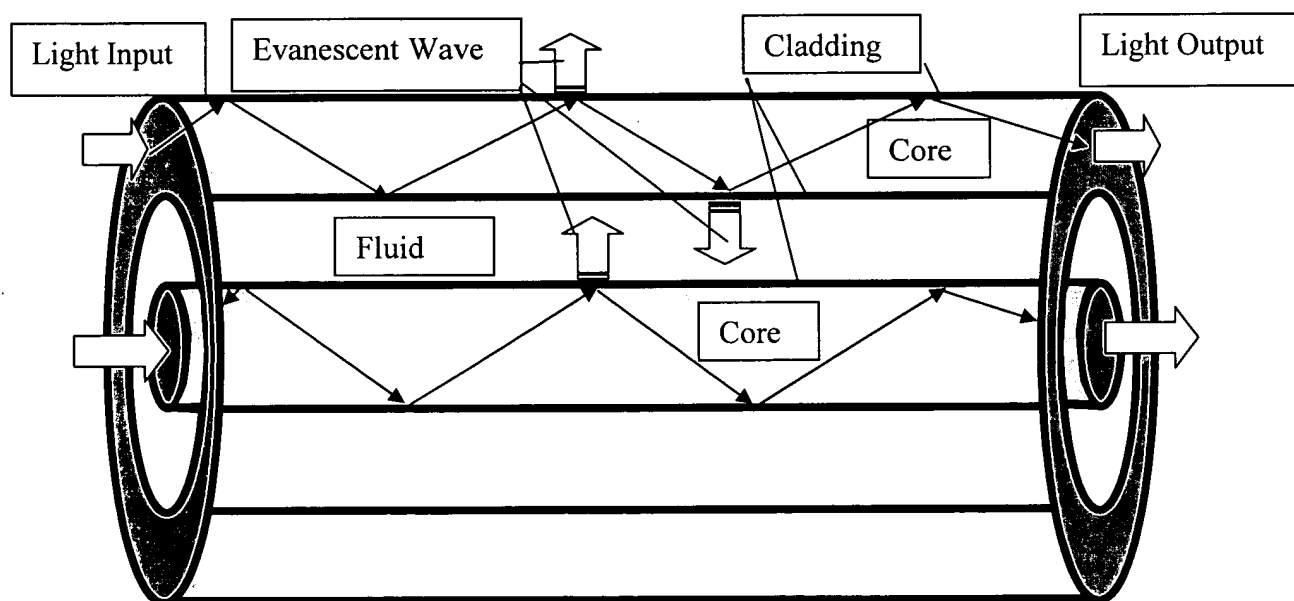


Hence, Bohnenkamp which teaches a capillary hollow waveguide does not teach or fairly suggest the claimed invention which relies upon the use of a fluid as a waveguide. Applicants request that the rejection be withdrawn.

### Lockhart

Claims 1, 2, 5-10, 12-15, 20, 21, 24, 27-31, and 33 are rejected under 35 U.S.C. § 102(e) as allegedly being anticipated by Lockhart, U.S. Patent No. 6,974,673 (Lockhart). Applicants respectfully disagree and traverse the rejection.

Lockhart is cited for teaching a hollow optical waveguide with a first opening and a second opening and a first biomolecular constituent attached to the inner wall of the hollow optical waveguide. Lockhart is also said to teach that light from a source such as a laser can be introduced into the light-input ends and that the device would be capable of guiding light through a capillary due to the second waveguide located within the that capillary. Lockhart's device is shown schematically below. Notably, light is guided in that device through a solid waveguide contained within a fluid inside the capillary. It is that solid waveguide and not the fluid that guides the light.



Lockhart does not teach or fairly suggest a device that guides light directly through the fluid contained into a waveguide. As such, Lockhart does not anticipate the claimed invention. Applicants request that the rejection be withdrawn.

## **REJECTIONS UNDER 35 U.S.C. § 103**

### **Claims 11 and 32**

Claims 11 and 32 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Lockhart in view of Kumar et al., U.S. Patent No. 5,624,850 (Kumar). Applicants respectfully traverse this rejection.

The teaching of Lockhart have been discussed above. Kumar has been cited for the concept of coating the capillary surface with a blocking solution to prevent non-specific absorption. However, Kumar does not rectify the deficiencies of Lockhart.

Neither reference, either alone or in combination, teaches or fairly suggests the a measuring cell comprising at least one tube capable of guiding light through a fluid contained therein or a system comprising such a measuring cell. Applicants request that the rejection be withdrawn.

### **Claims 16 and 17**

Claims 16 and 17 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Lockhart in view of Aker et al., U.S. Patent No. 6,558,626 (Aker).

The teaching of Lockhart have been discussed above. Aker is said to describe use of detectors such as photomultiplier tubes. Again, Aker does not rectify the deficiencies of Lockhart.

Neither reference, either alone or in combination, teaches or fairly suggests the a measuring cell comprising at least one tube capable of guiding light through a fluid contained therein or a system comprising such a measuring cell. Applicants request that the rejection be withdrawn.

**Claim 23**

Claim 23 is rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Lockhart in view of Saaski et al., U.S. Patent No. 6,484,594 (Saaski) or over Bohnenkamp in view of Saaski.

Both Lockhart and Bohnenkamp have been discussed above. Saaski is said to teach the use of a waste container and clearing of that waste. Saaski does not rectify the deficiencies of Lockhart or Bohnenkamp.

Neither reference, either alone or in combination, teaches or fairly suggests the a measuring cell comprising at least one tube capable of guiding light through a fluid contained therein or a system comprising such a measuring cell. Applicants request that the rejection be withdrawn.



**CONCLUSION**

Applicants respectfully request that this Amendment under 37 C.F.R. § 1.116 be entered by the Examiner, placing claims the pending claims in condition for allowance. Applicants submit that the proposed amendments of the claims do not raise new issues or necessitate the undertaking of any additional search of the art by the Examiner, since all of the elements and their relationships claimed were either earlier claimed or inherent in the claims as examined. Therefore, this Amendment should allow for immediate action by the Examiner.


In view of the foregoing amendments and remarks, Applicants respectfully requests reconsideration and reexamination of this application and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to Deposit Account No. 06-0916.

Respectfully submitted,

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